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<i>INVITED POSTER:</i> APOD mission status and observe APOD by VLBI

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On Sept. 20, 2015, the Chinese CZ-6 test rocket was launched successfully from TaiYuan Satellite Launch Center, and 20 satellites were sent simultaneously into a circular, near-polar and 520 Km altitude orbit. Among these 20 satellites, four CubSats, named with APOD (Atmospheric density detection and Precise Orbit Determination), are projected for atmospheric density in-situ detection and derivation via precise orbit. The APOD satellites, manufactured by DFH Co., carries a number of instruments including density detector, dual-frequency GNSS (GPS/BD) receiver, SLR reflector and S/X band VLBI beacon. The mission aims to detect atmospheric density below 520 Km. The ground segment is run by BACC for payload operation as well as science data receiving, processing, archiving and distribution. Currently, one of the APOD satellites and payload validation had finished, and the preliminary results are presented as follows. The precision of orbit determination is about 10cm by both overlap method and by compared with SLR observation, and the derived atmospheric density from this precise orbit determination matches well with in-situ detection.

Since three space geodetic techniques (i.e. GNSS, SLR, and VLBI) are co-located on APOD satellite, the observations can be used for combination and validation in order to detect the systematic differences. Furthermore the observations of APOD satellite by VLBI radio telescope can be used in an ideal fashion to link the dynamical reference frames of the satellite with terrestrial and, most importantly, to the celestial reference frame as defined by the positions of quasars. From a VLBI observational point of view, APOD satellites rather challenging since mutual visibility depends on the altitude of APOD satellite and the separation of the radio telescopes. And the APOD satellite travel through the field of view very fast. The possibility of observing APOD satellite by IVS VLBI radio telescopes will be analyzed in the presentation, considering continental-size VLBI observing networks and the small telescopes with sufficient speed.

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